

At last it occurred to me why they came, and on placing the cage on the floor the onslaught on the contents was a convincing proof that *A. panthera* would never be naturalised at St. Pedro.

I could adduce many other instances of the smelling and the "perception of sound" (to phrase it), but will not intrude on your space.

E. L. LAYARD

British Consulate, Noumea, New Caledonia, April 26

P.S. Since writing the above I named the subject to Père Montrousier, the celebrated French naturalist so long resident in this colony. He detailed the following experiment that he had made. He immersed a long-snouted weevil (*Ochthorinus cruciatus*) so as to cover it, all but the tip of the antennæ, with a coating of wax. On presenting to it oil of turpentine it became violently excited and endeavoured to escape. Another now had the tips of its antennæ only coated with the wax, and neither turpentine nor any other strong smelling substance at all affected it. He places the faculty of the "perception of sound" equally in the antennæ. Since the discovery of the telephone who shall say to what extent these delicate organs can recognise the vibrations of the air? And after all, what is our own "perception of sound" but the appreciation of a vibration? E. L. L.

On the Lichen *Gonidia* Question

THE morphological side of Schwendener's theory may be now regarded as fully proved. The opponents have confined themselves on the whole to *à priori* arguments, and of those who have applied themselves to carefully working out afresh the relations of hypha and gonidium, several, if not all, have been converted to the new views. No one can have much faith in the haphazard style of preparation and examination known, *par excellence*, as the "lichenological." However, one or two points remain which have not as yet received much attention. These are the beautiful symmetry of the lichen as a whole, the rareness of the application of the hypha to the gonidium, and the generally healthy look of the gonidia themselves. All this contrasts greatly with what we find, as a rule, in the relations of parasitical fungus and host.

With regard to the first objection I may call attention to the equally beautiful and symmetrical forms we find in galls, such as the spangles of the oak, the rose bedeguar, and the exquisite rosettes of certain *Dipterocarpeæ*.

It is, however, well known that many of the lower fungi can build up their protoplasm and live perfectly, if in addition to the salts needed for the growth of all plants (including nitrates or ammonium salts), there be present a tartrate or sugar. Now the gonidia, like the algæ with which they correspond, excrete as a cell-wall a thick layer of gelatinous consistency but giving reactions which show it a form of cellulose. It is in contact with, or through this that the hypha ramifies, and from this it can take up the necessary complement of the mineral food supplied by the substratum and medium. It can grow freely; and the gonidium, with its protoplasm intact, can go on growing as comfortably as the oyster infested by *Ciona*. Perhaps like the oyster it may be stimulated to a more active secretion of envelope, but its health is unimpaired. Hence, too, there is no physiological need for the hypha to come in contact with the gonidia, and the last argument of the old school becomes untenable.

Owens College, Manchester

MARCUS M. HARTOG

The Phonograph

IN experimenting lately with the phonograph it occurred to me to try whether, after a series of musical or articulate sounds have been recorded, other series could successively be superimposed on the same tinfoil and reproduced. I found that if the instrument be simply reset to the starting-point, and sung or spoken to a second time, it will afterwards faithfully reproduce both series of sounds as though two persons were singing or speaking simultaneously, and by repeating the same process, a third and fourth voice may be added, or one or more instrumental parts, all of which will be reproduced. This experiment forms a striking commentary on Helmholtz's theory of the mode in which the ear recognises different tones in a chaos of sound, by analysing the compound wave, which it receives, into its component simple vibrations. Here the aggregate impressions on the tin-foil produce, so to speak, a compound indentation capable of reproducing a wave of sound which the ear can resolve into the original constituents.

Temple

GEORGE P. BIDDER

Remarkable Form of Lightning

DURING a thunderstorm on Sunday afternoon, August 24, 1873, I saw a flash of lightning here exactly answering to Mr. Joule's description of "punctuation." The note of the storm in my diary says:—"Lightning and thunder very frequent but not violent. One flash, very near, had the appearance of a chain of alternate links, and remained visible, I should think, for half a second, gradually fading out." This persistence was, no doubt, mainly an optical illusion, but it shows the definiteness of the form. The flash was from cloud to cloud, and followed a very sinuous line, as described by Mr. Lawrence. Is not this what old books describe as "chain lightning?"

B. WOODD SMITH

Branch Hill Lodge, Hampstead Heath, July 12

OUR NEW PROTECTORATE

WE have only to do with politics in this journal in so far as they concern science; but without pronouncing any opinion on the wisdom of the action taken by our government in the Eastern question, it may not be amiss to say a few words from a scientific standpoint on the interesting territories which have just been brought into close relation with this country. To England the region included in Asiatic Turkey is in some respects the most interesting in the world. If not exactly the cradle of our family, there is good reason to believe that it is in close proximity to it; and no doubt it was one of the pathways by which the early Aryans sought their way to Europe. Historically and prehistorically, for the student of religion and the student of science, Turkey in Asia possesses features of the highest interest, and we may hope that one result of our new connection will be that our very imperfect knowledge of it in its various aspects will be rapidly filled up. Its shores—the Black Sea on the North, the *Ægean* on the west, the Mediterranean on the south, and, may we say, the Euphrates and Tigris rivers on the east—teem with historical associations. A careful investigation of its mountains and valleys, its rivers and numerous salt lakes, would doubtless yield the geologist a rich harvest of results, bearing everywhere as they do unmistakable evidence of former powerful volcanic action.

Asiatic Turkey, in its five great divisions of Anatolia or Asia Minor, Armenia, Kurdistan, Mesopotamia, and Syria, may be regarded as a western extension of the great central Asian plateau, with its surface much broken up by mountain chains and isolated ranges. This great plateau narrows very considerably as it approaches the Turkish territory in Asia, but increases in elevation. Here begins the Alpine region of Persia with Kurdistan; here are the lakes Urumiyeh and Van, and the sources of the rivers Zab, Tigris, Aras, and Euphrates. The table-land is broken up into and replaced by mountains, which rise to a great height, and by elevated valleys between them. On the north-east of Turkey-in-Asia both the mountain-ranges and the table-lands are united in the compact mountain-region and high table-land of Armenia, the country to the west resembling Europe in structure rather than Eastern Asia. Physically there are four divisions of this region, corresponding nearly to the divisions referred to above. The first is the elevated and mountainous table-land of Armenia, which extends in the form of a triangle between the angles of the three seas—the Caspian, the Black Sea, and the Gulf of Alexandretta on the south. Its central plain, on which stands Erzeroum, about which so much has recently been heard, rises to 7,000 feet above sea-level, and the highest peak of Ararat rises to above 17,000 feet.

The second great division is formed by the Caucasus, which is beyond the range of our present subject. The third separate mass is formed by the peninsula of Anatolia, or Asia-Minor, in the interior, a table-land of an average height of 3,000 feet, and joined to Persia by the mountain-chain of the Taurus. The Syrian mountains

form the fourth division, culminating in Mount Libanus and terminating in the isolated mountain-mass of Sinai. The whole extent of Turkey-in-Asia is estimated at 660,000 square miles, and its population variously estimated at from ten to twenty millions.

The most extensive and altogether most remarkable mountain-chain of Turkey-in-Asia is the Taurus, with its offshoot the Anti-Taurus, belonging mainly to the division of Anatolia. The Taurus begins on the east, by the Euphrates, where one of its peaks rises to nearly 10,000 feet, and runs irregularly westwards not far from the Mediterranean coast, through Caramenia and Lycia, ending in the islands of the Greek Archipelago. Both to the north and south it sends out shoots, the island of Cyprus itself being really a spur of the great mountain-mass. The northern arm, the Anti-Taurus, runs north-east; and at the Chain may be said to turn in a westerly direction along and at no great distance from the Black Sea to the Bosphorus, sending out a south-west spur culminating in Mount Olympus, near Broussa, and further south, on the Gulf of Adramyti, in Trojan Ida.

The separate portions of the Taurus inclose many plains and valleys, which lie terraced above each other in the line of the meridian. On the south side of the mountain lies the plain, formed from augitic rocks, of Diarbekr in Kurdistan, 1,800 feet above sea-level; in the middle of the Taurus is the cultivated valley of Alendah, and Lake Gorkik Gol, 4,000 feet high; on the north side is the plain of Liwas, 4,000 feet, and that of Baulus, 3,000 feet, above sea-level, from which the land sinks rapidly to the Black Sea. In the south-east part of the peninsula rises the isolated peak, having little connection with the main range, the Erdjas Dag—the Mons Argæus of the ancients. It stands on the plain of Kassarieh (Cæsarea), its foot being 3,300 feet above sea-level, and its summit, the culminating point of Anatolia, close on 13,000 feet above the sea. It consists entirely of volcanic products, and its summit contains two craters, long ago extinct. The whole inner plateau, west to near Kutaya and thence to the plain of Sardis and even to the west coast at Smyrna, bears evident traces of volcanic activity. Extinct volcanic cones, often of considerable height, lava-streams and other unmistakable signs of subterranean activity, extend over a considerable space. Earthquakes are of frequent occurrence, and warm sulphur springs are numerous in Anatolia.

In the Anatolian peninsula the rivers flow mostly north-westwards into the Black Sea, though the courses of not a few of them remain to be explored. The most considerable of these is the Kisi-Irmik (the ancient Halys), though one of the most interesting is the Menderch (ancient Meander), celebrated for its luxurious valley and winding corners, and for the fact that since Homer sang of it, the action of its current, combined with the action of the sea, has altered the whole aspect of the coast about Besika Bay.

The climate of Asiatic Turkey presents so many variations on account of the great inequalities of its surface, that any general view of it is impossible. In one day the traveller may go from the cold of winter to a heat almost tropical, and *vice versa*. In the Mesopotamian and Bagdad regions, at the head of the Persian Gulf, and along the banks of the Tigris and Euphrates the heat in summer is quite tropical. Sir Frederic Goldsmid in his "Telegraph and Travel," a work which contains many valuable notes on the features and condition of the country in 1864, found it average 96° in the shade near Mosul in the beginning of June.

The Anatolian peninsula gradually blends eastwards into the highlands of Armenia, which unite the mountains of Asia Minor with the great system of Central Asia, and give rise to the two great rivers of Asiatic Turkey, the Euphrates and the Tigris. Armenia is a land of terraces. Between the rivers rise dividing moun-

tain-ranges; within and between these ranges are wide, mostly level, steppe-like plateaux of various heights, which lie like terraces over each other; deep-cut valleys, gloomy, towering mountain masses; extreme climate, with severe winter and dry hot summer; in the valleys and on the mountain-slopes luxurious vegetation, but scanty on the plateaux; on the eastern border the landscape is Alpine, and forms the immediate connection between Armenia and the great table-land of Iran. The Armenian mountains are continued southwards into Kurdistan, gradually shading off into the great plain of Mesopotamia. In the north of Kurdistan lies the romantic salt lake Van, 1,200 square miles in area, at a height of 4,000 feet above sea-level. The two streams which water Mesopotamia, the Euphrates and Tigris, have a generally parallel course, sometimes approaching and sometimes receding from each other. At Bagdad they approach most closely before uniting, not far above the outlet in the Persian Gulf, giving the included land the shape of an hour-glass. It was this included land which the ancients appropriately named Mesopotamia, the northern half being now known as El Jesireh, or the island, and the southern Irak Arabi, or the Arab Irak, to distinguish it from the neighbouring Persia, or Irak Ajemi. The delta of the united stream begins about forty miles above its outlet, and there is evidence that since the time of Alexander the Great, the land must have encroached considerably on the Gulf. Lying between Mesopotamia and the coast region of Syria, and its southern part, Palestine, is the great Syrian desert, a chalk plateau of about 1,800 feet above the sea, bound on the west side by a great depression.

The flora of Asiatic Turkey, as might be expected, is very varied, partaking of a combined temperate and sub-tropical character. As to its fauna, the lion has disappeared from the countries west of the Euphrates, while in Mesopotamia are found the hyæna, panther, buffalo, and wild boar; jackals, bears, wolves, and wild hogs are met with in Asia Minor. The leopard is still found in the interior of Palestine, the Syrian bear in Lebanon, while European animals are found nearly everywhere. The whole territory is included in the Mediterranean sub-region of the Palæarctic Zoological region. (See Wallace's "Distribution of Animals.")

With regard to Cyprus a volume might be written on its history, from the time of the Phœnicians (it is supposed to be the Chittim of the Old Testament) till now, and we quite recently noticed Gen. Cesnola's remarkable work on the antiquities of the island. The ancients appropriately compared the shape of the island to that of a deer's skin or a fleece spread out. In length it is about 140 miles, and about 45 in breadth, much about the size of Skye and the Long Island from Barra Head to the Butt of Lewis together. The centre of the island is a plain or table land, while mountain-ranges occupy the west and south-west, and the northern coast is mountainous along its whole extent. In the northern range the highest summit does not exceed 3,340 feet, while among the southern masses, Mount Olympus (Troδος or Troödos) reaches a height of 6,590 feet. Other summits range from 2,000 to 5,000 feet. In the time of Titus a volcanic outburst from the northern range did great damage, and destructive earthquakes seem to have been at one time frequent. The streams are few and small; rain is almost unknown from May to October; the heat of summer is excessive on the plains, though the winter is mild, and the climate on the whole may be regarded as healthy. At one time the island appears to have been thickly wooded and to have yielded valuable mineral and vegetable products. The island is said to have then sustained a population of a million, but now the inhabitants do not exceed 180,000. Speaking of the flora of the island Drs. Unger and Kotschy in their work "Die Insel Cypren," say:—

"In Cyprus prairie or meadow land does not exist; the

'Ackerland' takes the place of it. After the rains, but only for a short time, cereals give a satin-like green to the landscape; and among them grow a profusion of flowers; but these artificial rather than natural fields fade more quickly than the flowers, and scarcely last a few weeks beyond the last spring rain. There is only one small corner of the island where the vegetation resembles ours. The great heat of the summer destroys all the tender plants; only those plants survive which through their anatomical construction, or hard substance, or in consequence of growing near water, can resist the effects of the heat.

"There is great resemblance in the vegetation throughout the island to the Mediterranean. In February and March there is on all the river edges a profusion of lilies; in April and May on the land side is one carpet of flowers. During the heat, however, the land assumes a yellow tint. Pine forests abound, olives, myrtles, and laurel trees. As far as the island has as yet been explored we know that there are 1,000 different sorts of plants. No eastern island can show such a rich forest growth as Cyprus.

"The *Pinus maritima* in Cyprus covers the hills and mountain regions to the height of 4,000 feet as one of the commonest trees. The *Pinus laricio*, which covers all the heights to 4,000 feet above the sea, rises on the western mountains of the island to 6,000 feet, and gives it a dark appearance from the sea. The wild cypress (*Cupressus horizontalis*) is the third tree which grows commonly in the eastern part of the island and in some places forms by itself whole woods. On the whole of the northern chain of mountains this wild cypress grows often to the height of from 2,000 to 3,000 feet above the sea. Great forests of wild cypresses must also have covered the whole of the south of the island, as also a shrub, the *Juniperus phœnicea*. In the north several varieties of oak are found, and throughout the island the arbutus abounds; the carob-tree and olive flourish on the banks of all the rivers and up to an elevation of 1,000 feet above the sea."

Dr. Unger's work gives a catalogue of the fauna of the island, which includes a considerable number of troublesome insects. Copper, gold, silver, and precious stones were at one time found in considerable quantities, and the mineral resources of the island are probably capable of great development. Doubtless one of the first cares of the new proprietors will be to obtain an accurate survey and estimate of its resources.

No less important than the physical are the ethnical conditions of the vast region to which we have just undertaken the responsibility of introducing the blessings of good government. Indeed, from the administrative point of view, a correct knowledge of the inhabitants of any country is almost more necessary than is that of their outward surroundings. Yet the most profound ignorance too often prevails regarding the affinities and characteristics of the peoples, the direction of whose destinies has been either assumed or thrust upon "the Mother of Empires." How few of our Indian administrators have yet succeeded in grasping the difference between *Aryan* and *Dravidian*, not to speak of *Kolarian*, and how many still affect to speak collectively of all the natives as "Niggers"! If it is so with a country which has been under British rule for upwards of three generations, no very general or accurate knowledge can be expected of the ethnography of Asiatic Turkey, with which our relations have hitherto been of a purely commercial character. Hence no apology will be needed for here submitting a few notes on the subject, for which we are indebted to Mr. A. H. Keane, B.A.

Apart from the question of the Autochthones, if any still survive, three distinct stocks are at present in possession of Turkey-in-Asia, taking the term in its widest sense, so as to include parts of the Arabian peninsula, as

well as Syria, Mesopotamia, Armenia, and Asia Minor proper. These stocks or racial families are the Ural-Altaic, Aryan, and Semitic, each of which, omitting such minor distinctions as Juruks, Gipsies, Samaritans, Nestorians, Chaldeans, may be said to be represented by three separate offshoots, as clearly shown in the subjoined scheme. Here the various nationalities are grouped in the first, second, and third columns, according to their ethnical, linguistic, and religious connections respectively, while in the fourth an approximate estimate is given of their numbers, say twenty millions altogether.

		Language.	Religion.	Population.
I. Ural-Altaic Stock.	Turks	Turkish	Muhammedan	12,000,000
	Turkomans ...	Tatar dialect...	Muhammedan	300,000
	Kysyl-Bashes	Turkish	Pagan	?
II. Aryan Stock.	Hellenes	Greek	Orthodox and United Greek	2,000,000
	Armenians ...	Armenian ...	Orthodox and United Ar-	3,000,000
	Kurds	Kurdish; Zaza	menian ... Muhammedan mainly	1,000,000
III. Semitic Stock.	Arabs	Arabic	Muhammedan	1,500,000
	Maronites ...	Arabic	United Syrian	30,000
	Druses	Arabic	Pagan	40,000

Mention should also be made of the few Circassians still surviving of those who, some years ago, fled from the sword of the Russians, and of the few thousand Lazs still left to Turkey by the Berlin Congress. Both belong to the southern branch of the CAUCASIAN STOCK, which is entirely distinct from any of the foregoing. Nor should the Jews be overlooked, who, though still numerous in some of the larger cities (10,000 in Jerusalem alone), have almost disappeared from their original homes.

But of the really representative peoples in these regions the Turks are undoubtedly entitled in every respect to our first consideration. Anatolia, that is to say, all the country between the Upper Euphrates and the Ægean Sea, and from about the 36th parallel northwards to the Euxine has for centuries been the true home of this race. Although even here intermingled in the west with the Greeks, in the east with the Armenians, Kurds, and Arabs, they form, on the whole, the great bulk of the population of Asia-Minor within the specified limits, presenting a compact and homogeneous mass—homogeneous in every sense of the word, in race, speech, and religion. They are unquestionably of pure Tataric descent, their Muhammedan prejudices having enabled them to keep aloof from the surrounding populations ever since they entered the country as conquerors in the eleventh century. Hence it is that Anatolia has long been the true backbone of the Turkish rule, a backbone reaching even across the Bosphorus, and that in Anatolia alone it is possible profitably to study the true character of the Osmanlis.

Doubtless the word "Turk" itself is now eschewed in Asia-Minor, where it has become almost a term of reproach corresponding to our "clod-hopper" or "yokel." But this simply means that the Anatolian Turks have become essentially a rough peasant people, as contrasted with their more refined kinsmen of Roumelia and Constantinople. It would be difficult to imagine a greater contrast than is presented by the Asiatic and European branches of this race, though it is of the last importance that the difference should be thoroughly realised before a just estimate can be formed of the Turks as a factor in the calculations of statesmen. They have, unfortunately, been too often judged from the polished and somewhat effeminate Effendis of the Capital, as many superficial observers are apt to confound the gay, frivolous *jeunesse dorée* of the Paris boulevards with the plodding and really thrifty agricultural people of France.

The Anatolian Turks are a lusty, stalwart race, of rude manners and harsh utterance, still speaking nearly in its purity the primitive agglutinating Turkish tongue, which in Stambûl has become a sort of Arabo-Perso-Tatar medley. They are not, perhaps, over-industrious, cultivating little more than is needed to supply their modest wants, and showing a preference for the fig, the vine, and the olive, plants yielding bounteous returns for the little care bestowed on them. Though by constitution extremely frugal, with few and simple belongings, and living in the humblest of dwellings, they are still generally oppressed with debts, and at the mercy of the usurer and the tax-gatherer, the former relentlessly exacting his pound of flesh, the latter often farming the public revenues, forestalling the tithes before harvest-tide and basing his estimates on calculations not always realised even in more favoured climes. Hence many yearly give up their holdings, sinking to the position of proletariates, the day-labourer's life being in many respects preferable to that of the small tenant farmer left unprotected by the authorities and an easy prey to the unscrupulous in a country where the administration of justice leaves much to be desired.

Fortunately for their rulers, past and to come, the Anatolian Turks are a patient, much-enduring race, kindly, hospitable, and tolerant in religious matters. Of an earnest, taciturn temperament, with much sound understanding and shrewd observation, they are yet devoid of foresight and business habits. Hence they make, as a rule, indifferent merchants, so that most of the wholesale trade has fallen into the hands of the rival races. In the country districts they are simply tillers of the land and stock-breeders, in the towns dealers in small wares mostly of home production, or else craftsmen employed in such industries as are needed to supply the few wants of Turkish life. Their seafaring qualities, however, have been unjustly decied, for in the hands of efficient officers they make excellent sailors, while as organisers and conductors of caravans they are unsurpassed. Their greatest shortcomings are perhaps a certain apathy due mainly to the universal belief in *Kismet*, or "the Inevitable," combined with the absence of progressive ideas and indifference to the future. Heedless of the morrow they will often pay exorbitant interest to escape from present pressure. Hence where mingled with other peoples they have fallen somewhat behind in the race, though never sinking to abject want, so modest are their needs, so rich their lands in varied resources. Military service, also, as is well known, weighs heavily on them, and on them alone, helping with polygamy, and all its accompanying evils, to account for the steady decrease of the Turkish element for some years past, especially on the coast.

Here the somewhat indolent Osmanli has had to confront the more versatile Greek, still clinging to his old Ionian homes along the eastern shores of the island-studded Ægean, and it is not, perhaps, surprising that under such circumstances his quick-witted rival has largely succeeded to his inheritance. For the second time in the history of the Hellenic race, *Græcia capta feros victores cepit*. An industrious trader, a shrewd calculating merchant, an excellent seaman, an intelligent agriculturist, the Greek outstrips the Osmanli in his own special province, while monopolising the learned professions. Smyrna has thus again become a Greek city, and the Greek race has in modern times everywhere displayed a praiseworthy zeal for the spread of education, while fostering among the people a healthy national sentiment. A well-directed and widely-ramifying association, radiating from Athens, encourages a movement which has tended more than anything else to maintain the influence of the Hellenic race in western Anatolia, despite their numerical inferiority.

Next to them in importance are the Armenians, sparsely diffused throughout the east from Constanti-

nople to Calcutta, and still existing as a distinct nationality in the north-eastern highlands of Anatolia. Intellectually almost on a level with the Greeks, out-rivalling them in commercial enterprise, the Armenians present certain distinctive physical, social, and moral characteristics by which they are readily recognised wherever met. Conspicuous amongst these traits, besides their speech, belonging to the Eranian branch of the Aryan family, are their national dress, their bushy close-set eyebrows, and a decidedly unlovable disposition, which has earned for them the dislike and contempt of their neighbours. Their trickery and avarice have become proverbial throughout the East, and after making all due allowance for exaggeration, they cannot be altogether acquitted of a certain moral obliquity. Deprived for generations of all political rights, they have taken eagerly to trade like the Jews in Europe, like them in many places monopolising it, ruling the money market, and notwithstanding mutual family jealousies ever ready to band together and make any sacrifices for the common good. As traders they certainly display an amount of keenness and cunning, though of a somewhat low order, dealing by preference in "the cheap and nasty," and retailing their "shoddy" and "Brummagem" wares at exorbitant prices to an ignorant *clientèle*.

Constitutionally timid and reserved they may on the whole be regarded as a feeble race, rarely appealing to arms in self-defence, in all cases ever ready to yield submission to the strongest. Of all Christian peoples the Armenians harmonise best with their Turkish rulers; they habitually speak Turkish like a second mother-tongue, and come nearest to the Osmanli in their quiet, earnest disposition.

Of far different temperament are their southern neighbours, the fierce, freedom-loving Kurdish highlanders. Long recognised as belonging also to the Eranian branch of the Aryan stock, in which they seem linguistically to approach nearer to the Persian than to the Armenian sub-division, the Kurds have been variously depicted, according to the sympathies of the writer, as brave, chivalrous mountaineers or else treacherous, lawless, and blood-thirsty marauders. All, however, agree in describing them as of a restless and unruly disposition, some attributing this quality to the effects of Turkish misrule, others to inherent national temperament, the latter appealing with some plausibility to the sentiment of antiquity, according to which the fierce *Carduchi* of Xenophon evidently bear a strong family likeness to their modern descendants.

What may be called the disturbing element in Asiatic Turkey is continued from Kurdistan southwards to Arabia by the Bedouins of the Syrian desert. Half savage Kurdish tribes in the uplands about the head streams of the Tigris and the Euphrates, almost equally restless nomad Arab tribes in the plains watered by those rivers will for a long time tax all the watchfulness of a strong and wise administration. Nominally subjects of the Porte, the Shamara, Beni-Lam, and other powerful Arab tribes have long maintained an ill-disguised standing feud with the authorities, often making their presence unpleasantly felt, especially along the right bank of the Euphrates from about the parallel of Aleppo all the way to the Persian Gulf. If united they might easily bring from 10,000 to 20,000 formidable mounted warriors into the field. But here as elsewhere tribal dissensions neutralise their power, enabling the Turks still to keep the upper hand in the Mesopotamian plains, and show a fair front towards the Persian frontier.

A glance at the population column in the above scheme will show at once that the peoples hitherto touched upon—Turks, Greeks, Armenians, Kurds, Arabs—can alone possess any real importance for the future administrators of these regions. The Kysyl-Bashes, Juruks, Druses, and Maronites, doubtless present many curious problems

to the ethnologist and philologist. But they are numerically too insignificant to claim further notice here.

The Island of Cyprus presents no fresh ethnical elements beyond those specified in our scheme. The bulk of the population are Greek, or, at all events, a mixed Phœnician, Carian, and Greek people that have long been Hellenised. The rest are mainly Turks, and both have hitherto been permitted to live harmoniously together. They are not likely to prove a source of trouble to their new rulers.

As to the future of this varied and interesting region, it is not for us to speak. Everywhere there are evidences that at one time it must have been thickly populated and its resources highly developed. What the country is capable of may be learned from the classical reports of Palgrave, Scherzer, and other British and foreign consuls, as well as from the various special reports on the much-talked-of trans-Asiatic railway. In this connection books worth referring to are Palgrave's "Essays on Eastern Questions," Goldsmid's "Telegraph and Travel," and Goldsmid and Blanford's "Eastern Persia." Good authorities to consult on the geography and science of the region are the various articles in the "English Cyclopædia," recent volumes of Petermann's *Mittheilungen*, Hellwald's "Die Erde und ihre Völker," the *Bulletin* of the French Geographical Society, Chihacheff's "Asie Mineure," Schliemann's and Cesnola's works, Thielmann's "Caucasus, Persia, and Turkey," Unger's "Die Insel Cypern," besides older well-known works.

TYCHO BRAHE'S CORRESPONDENCE¹

WE have received the first three *fasciculi* of this work, projected by M. Früs in 1876. Its purpose is to place in the hands of the astronomer, in a collective form, the letters of Tycho and his correspondence, preserved in the Royal Library at Copenhagen, and in the libraries of Vienna, Pulkowa, and Basle, and others which may be found elsewhere, and it is expected that the work will be complete in about sixteen parts. The earliest letter is one from Tycho to Joannes Aalborg, afterwards librarian at Copenhagen, dated January 14, 1568. There are letters to or from Steno Bille, or Bilde (an uncle of Tycho's, at whose house, it may be remembered, he detected the celebrated star of 1572 which is associated with his name), Thaddæus Hagecius, physician to the Emperor Rudolph II., Paulus Haintzel, Hieronymus Wolfius, and others, whose names occur in the well-known treatise, "De Nova Stella Anni 1572." In a letter, No. 47, written in 1584, to Henricus Brucaeus, Tycho enters into some discussion of the "Hypothesis Copernici," in another to Hagecius (we follow the Latin names in use at the time) he refers at length to the parallax of the comet of 1577, observed by him with much care; from his observations of this body, as Pingré says, "on en conclut que le lieu des comètes était au-delà du ciel de la Lune."

The third part contains a finely-executed portrait of Tycho (Woodburytype) from the oil painting in the possession of Dr. Crompton, of Manchester, for information respecting which M. Früs refers his readers to *NATURE*, vol. xv. p. 406, and vol. xvi. p. 501; an account of it also appeared in the *Proceedings* of the Manchester Literary and Philosophical Society, October 31, 1876.

We may express the hope that the success attending the publication of the first three numbers of this work may be sufficiently encouraging to induce a more rapid issue of the remaining parts.

OUR ASTRONOMICAL COLUMN

PERIODICAL COMETS IN 1879.—Of the known comets of short period, two will pass through perihelion in the spring of the ensuing year. The comet discovered by

¹ "Tychonis Brahei, et ad eum doctorum virorum Epistolæ nunc primum collectæ et editæ," a F. R. Früs. (D. Nutt: London.)

Brorsen at Kiel in February, 1846, and since observed in 1857, 1868, and 1873, according to the elements deduced at the last appearance by Dr. Schulze, will arrive at perihelion again on April 1, perturbations, which must be light in the actual revolution, being neglected. This comet still approaches very near to the orbit of the planet Jupiter, though perhaps not quite so close as in 1842, when the present form of orbit was impressed upon it by the action of the planet, the point of nearest approach being at a true anomaly of $167^{\circ} 48'$, or in heliocentric longitude $283^{\circ} 30'$ (Eq. 1870); when last passing this point of its orbit, early in October, 1875, Jupiter was distant from the comet, 5.58, whence the effect of his attraction upon the length of the present revolution will be comparatively trifling. At the ascending node the comet may approach pretty near to Venus, as was the case in October, 1873, a few days previous to the last perihelion passage. To obtain an idea of the track in the heavens in the spring of next year, we may assume that the comet will arrive at its least distance from the sun at midnight on April 1 (guided by Schulze's elements) and will have the following positions:—

12h.	R.A.	N.P.D.	Distance from Earth.	Distance from Sun.	Intensity of Light.
March 12...	23.6	89.7	1.35	0.71	1.08
" 22...	32.4	80.5	1.20	0.63	1.77
April 1...	41.6	69.7	1.05	0.59	2.58
" 11...	51.7	57.5	0.91	0.63	3.06
" 21...	63.3	45.9	0.81	0.71	3.00
May 1...	85.0	33.3	0.74	0.83	2.66
" 11...	118.6	27.2	0.71	0.96	2.12
" 21...	154.2	30.8	0.74	1.09	1.53
" 31...	176.3	40.1	0.81	1.23	1.02
June 10...	189.0	50.2	0.91	1.36	0.65

Whence it may be expected that the comet will be observed in the latter half of March, attaining its greatest brightness as it traverses the constellation Perseus, about the middle of April.

The second comet due in 1879 is that discovered by M. Tempel at Marseilles in April, 1867, and re-observed in 1873, after undergoing great perturbation from a close approach to the planet Jupiter, early in 1870. The best elements for 1873 are those of Sandberg, according to which the next perihelion passage would fall on April 26, without taking into account the effect of planetary action, which, as in the case of Brorsen's comet, is not likely to be material in the present revolution; indeed, when the comet was last in aphelion, and nearest to the orbit of Jupiter, the planet was on the opposite side of the sun.

Assuming, then, that the next perihelion passage will take place at midnight on April 26, the following positions and distances will result:—

	R.A.	N.P.D.	Distance from Earth.	Distance from Sun.	Intensity of Light.
April 26 ...	261.8	106.5	0.916	1.770	0.38
May 16 ...	262.9	109.3	0.819	1.778	0.47
" 26 ...	262.1	111.0	0.796	1.789	0.49
June 5 ...	260.7	112.6	0.791	1.804	0.49
June 15 ...	259.1	114.5	0.808	1.823	0.46

The comet under the above condition, will therefore be situated during the whole period in the southern part of the constellation Ophiuchus, and it may be hoped that it will be well observed, as, during the ensuing revolution, material perturbations of the elements may be again occasioned by the action of Jupiter, from which body the comet at the beginning of October, 1881, may not be distant more than 0.55, a degree of approximation that, although not sufficient to lead to such heavy disturbance of the comet's motion as in 1870, will yet render a precise determination of the orbit in 1879 very essential for an accurate prediction of the apparent track in 1885.

In September, 1879, another return of Biela's comet will be due with the elements of 1866, but we reserve a few remarks upon this subject for another note.